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Skin analysis findings and disease severity in fibromyalgia patients

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Abstract
Aim: Fibromyalgia syndrome is a non-inflammatory disease characterized by widespread pain and various musculoskeletal symptoms. It can cause signs and symptoms in different systems of the body. Dermatological manifestations have not been fully clarified.
Material and Methods: Participants were divided into two groups as patients and healthy controls . 25 people were included in each group. The disease severity of the patients and its impact on daily activities were evaluated with the Fibromyalgia Impact Questionnaire (FIQ) and Visual Analogue Scale (VAS). Skin analysis of both groups was performed with the API-100 Skin Analyzer. Erythema was assessed with the Clinician's Erythema Severity Index.
Results: In this study %94 of the participants were women and %6 were men. The average age was 41.06±6.55. When the groups were compared, it was observed that the parameters determining skin quality were statistically significant in the control group than in the patient group. It was observed that fibromyalgia patients with skin erythema and sensitivity had higher VAS and FIQ scores than controls ($p<0.05$).
Discussion: As a multisystemic disease, fibromyalgia is also likely to cause dermatologic symptoms. A multidisciplinary approach may be recommended in the treatment and follow-up of these patients.

Keywords
Fibromyalgia, Skin Findings, Pain, Quality of Life

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Introduction

Fibromyalgia syndrome (FMS) is a non-inflammatory rheumatic disorder characterized by chronic and widespread musculoskeletal pain. The prevalence of FMS is between 1-4% in the normal population and is approximately three times more common in women than in men [1]. Abnormalities in central pain mechanisms are thought to play a critical role in etiopathogenesis, although it is not clear . Fibromyalgia patients are thought to have pain regulation disorder. The pain is usually accompanied by other systemic symptoms. Fatigue, stiffness, sleep quality disturbance, numbness in the extremities, migraine, intestinal irregularities, pelvic pain, Raynaud-like symptoms, depression and anxiety disorder are among these symptoms [2, 3].

Recently, the role of peripheral nerves and neurogenic inflammation have been implicated in the pathophysiology of fibromyalgia. As one of the results of this process, skin findings can also be observed in FMS. Skin-related symptoms such as burning, tenderness, itching, as well as diseases such as seborrheic dermatitis, eczema, rosacea, lichen simplex chronicus, and dermographism have been reported in fibromyalgia patients. It has been observed that the frequency of rosacea and seborrheic dermatitis especially increases in these patients. It is thought that central mechanisms play a role in hyperthermia and erythema in rosacea patients [4]. However, it cannot be said that there are sufficient studies on skin involvement in fibromyalgia patients. Therefore, as a result of our study, we aimed to evaluate the skin findings of these patients and measure their the relationship between these findings with and disease severity.

Material and Methods

Patients between the ages of 25-55, diagnosed with fibromyalgia according to the 2010 American College of Rheumatology criteria, and healthy controls were included in the study. Patients having a history of systemic or inflammatory diseases or receiving active treatment for any skin disease were excluded from the study. This study was approved by the ethics committee (ID 2022/10), and it was performed in accordance with the Helsinki Declaration. Informed. and written consent was obtained from all participants.

A Turkish validation of Fibromyalgia Impact Questionnaire (FIQ) and Visual Analogue Scale (VAS) were used to determine the clinical severity and functional disability of the FMS patients. FIQ consists of 10 self-administered scales related to physical functioning, work status, sleep, stiffness, depression, anxiety, pain, fatigue and wellbeing [5]. The visual analoganalogue scale is scored from 0 to 10 and is used to determine pain severity [6].

Skin analyses were performed with the API-100 skin analyser. During the analysis, skin hydration, elasticity, sebum, sensitivity, melanin accumulation, acne, moisture, pores and wrinkles were evaluated. Analysis results were recorded. Skin erythema was assessed by the same dermatologist using the Clinician's Erythema Severity Index which is a 5-point scale for measuring erythema severity [7].

Healthy volunteers consisted of people who applied to the Family Medicine outpatient clinic for periodic health examination and agreed to participate in the study. Skin analysis was performed and erythema scale was applied to all healthy controls.

Statistical Analysis

All statistical analyses were performed using Statistical Package of Social Sciences (SPSS) software (version 22.0 for Windows). The results were expressed as mean ± standard deviation (SD). The clinical profile of the patients was analysed by chi-square test for qualitative variables. Mann-Whitney U test was performed to compare quantitative variables. Spearman correlation test was used to evaluate the correlation of within-group variables with each other. Statistical significance was defined as $p< 0.05$.

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

A total of 50 people (25 FMS patients, 25 healthy controls) were included in the study. The mean age for the patient and control groups was 39,8±6,51 and 42,3±6,47 years, respectively. No significant difference was observed between the two groups in terms of age and gender, marital status, occupational distribution and education level (Table 1) ($p<0.05$).

When the skin analysis findings were evaluated, it was seen that 36% of fibromyalgia patients had skin sensitivity, while it was present in 22% of the control group (Figure 1). While skin elasticity was observed it was significantly higher in the control

Table 1. Demographic data of groups

		N (%)	P
Age		41.06 ±6,55	0.13[a]
Gender	Female	47 (%94)	0.55[b]
	Male	3 (%6)	
Marrial status	Single	5 (%10)	0.63[b]
	Married	45 (%90)	
Occupational status	Unemployed	36 (%72)	0.52[b]
	Working	14 (%28)	
Education status	Primary school	6 (%12)	0.88[b]
	Secondary school	8 (%16)	
	High school	26 (%52)	
	Collage	10 (%20)	
Use a decimal point (not a comma) with decimal numbers.			

[a] Mann-Whitney U test; [b] Chi-square test; p<0,05 significant

Table 2. Comparison of skin analysis findings between FMS and control group

	FMS	Control	P
Sensitivity	18 (%36)	11 (%22)	0.04
Low elasticity	16 (%32)	8 (%16)	0.02
Melanin deposition	8 (%16)	16 (%28)	0.08
Normal pore structure	18 (%36)	21 (%42)	0.3
Acne tendency	3 (%6)	2 (%2)	0.2
Increased sebum levels	17 (%34)	16 (%32)	0.1

Chi-square test; p<0,05 significant

group, and dry skin findings were present in FMS patients ($p<0.05$) (Table 2).

When the relationship between VAS and FIQ scores and skin analysis findings in fibromyalgia patients was evaluated, a positive correlation was found between disease activity and erythema level, sensitivity and pain in the patient group (Table 3).

Discussion

In this study, skin findings in fibromyalgia patients were analysed and compared with healthy controls, and their the relationship between these findings with and disease activity was also evaluated. In our study, it was observed that some dermatological findings, especially erythema and sensitivity, were observed more frequently in FMS patients than in healthy controls. Recent studies have revealed the role of peripheral nerves and neurogenic inflammation in FMS [8]. Fibromyalgia is not considered a disease classically associated with skin findings, but pathological examinations of the skin of FMS patients have detected changes such as oxidative stress, elevated cytokines and mast cells. The reason why erythema and sensitivity findings are observed in FMS patients can be explained by the role of substance P, mast cells, interleukin-1β and tumor necrosis factor-alpha, which contribute to neurogenic inflammation. In a study comparing skin biopsy samples, fibromyalgia patients not only had greater mean mast cell counts but also had increased mast cell degranulation and intradermal immunoglobulin G deposition, supporting the possibility of neurogenic inflammation in fibromyalgia patients [8, 9]. Researchers thought that structural differences in the skin may underlie the pathogenesis of fibromyalgia. They noted that due to a difference in collagen metabolism, the accumulation of collagen deposits around peripheral nerves may also have reduced pain tolerance in these patients (10). Additionally, there are studies showing that the incidence of fibromyalgia increases in skin patients with skin diseases such as psoriasis, acne vulgaris, rosacea, seborrheic dermatitis, SLE and urticaria, as well as skin findings detected in FMS [11-16].

Table 3. Association of disease activity with skin findings in patients with fibromyalgia

		ESI	FIQ	VAS	Sensitivity	Sebum	Elasticity
EDÖ	Spearman's correlation	1	,489*	,323	,623**	-,444*	-,569**
	Sig (2-tailed)		,013	,115	,001	,026	,003
	N	25	25	25	25	25	25
FIQ	Spearman's correlation	,489*	1	,498*	,463*	,114	-,389
	Sig (2-tailed)	,013		,011	,020	,586	,054
	N	25	25	25	25	25	25
VAS	Spearman's correlation	,323	,498*	1	,108	,352	-,288
	Sig (2-tailed)	,115	,011		,607	,085	,162
	N	25	25	25	25	25	25
Sensitivite	Spearman's correlation	,613**	,463*	,108	1	479*	,492*
	Sig (2-tailed)	,001	,020	,607		,015	,012
	N	25	25	25	25	25	25
Sebum	Spearman's correlation	-,444*	,114	,352	,479*	1	,104
	Sig (2-tailed)	,026	,586	,085	,015		,620
	N	25	25	25	25	25	25
Elastisite	Spearman's correlation	-,569**	-,389	-,288	,492*	,104	1
	Sig (2-tailed)	,003	,054	,162	,012	,620	
	N	25	25	25	25	25	25

ESI: Erythema Severity Index; FIQ: Fibromyalgia impact questionnaire; VAS: Visuel analog scale.

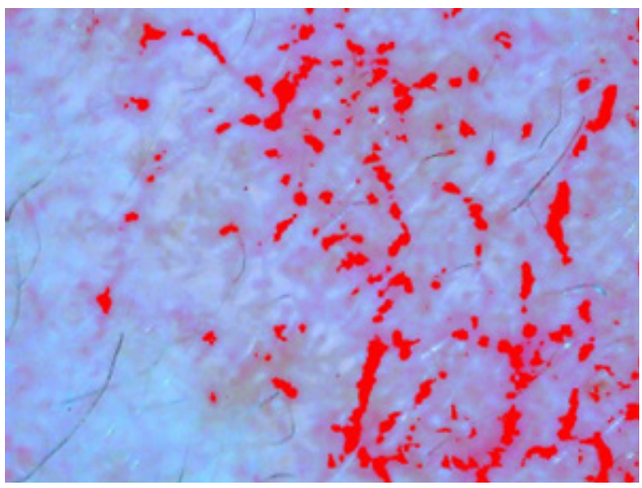

Figure 1. Sensitivity analysis image of a FMS patient

In our study, it was observed that the participants in the FMS group had less skin elasticity and moisture content. Living conditions such as intense stress, hormonal factors, environmental pollution, nutrition, smoking and alcohol are among the factors that affect the skin structure. When the skin is exposed to these living conditions for a long time, dryness of the skin, wrinkle formation, loss of elasticity and thinning of the dermis may occur over time [17]. Considering the role of stress and living conditions in the FMS mechanism, it is possible that the skin collagen structure is disrupted in the early stages in these patients. Similarly, in a study conducted in patients with papulopustular rosacea, it was reported that transepidermal water loss increased, thus moisture levels decreased and pH levels increased [14]. It has been observed that the physiological response of the central nervous system to hyperthermia is impaired in rosacea patients, and it is thought that this system may play a role in the pathogenesis. This disorder has also been held responsible for rash attacks [4]. All of these findings may suggest the possibility that the role of the central nervous system is similar in the pathogenesis of FMS and skin diseases. In this study, sebum level and acne tendency in FMS patients were similar to the control group. When the literature was reviewed, no study showing a relationship between FMS and acne tendency was found. Many factors such as genetic predisposition, bacterial infections, hormonal disorders, smoking and diet may cause acne [18]. We did not observe any significant difference between the groups in terms of melanin deposition and wrinkle formation, which are other parameters of skin analysis.

When we evaluated VAS and FIQ scores in our study, we observed higher values in the FMS group compared to healthy controls in accordance with previous studies [19]. In addition, when we looked at the relationship of skin findings with VAS and FIQ scores in FMS patients, we found that sensitivity and erythema were positively correlated with disease severity. This may

indicate that common pathophysiological mechanisms, such as neuroinflammation, may have developed in both conditions. FMS patients with skin involvement may be expected to have more pain and less participation in activities of daily living.

Conclusion

In our study, findings that we objectively measured and evaluated by skin analysis such as erythema, sensitivity and loss of elasticity were observed at a higher rate in FMS patients compared to healthy controls. Considering the complex pathogenesis of FMS, clinicians may need to take a more multidisciplinary approach in the treatment and follow-up of these patients. It may be recommended to evaluate this disease, which may have systemic involvement, in terms of skin findings and to seek the opinion of a dermatologist when necessary.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and Human Rights Statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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